What is claimed is:

1. An ink-jet recording head, comprising:

a pressure generating chamber that communicates with a nozzle orifice; and

a piezoelectric element having a lower electrode, a piezoelectric layer and an upper electrode being provided in a region corresponding to the pressure generating chamber via a vibration plate,

wherein there are provided within a region facing the pressure generating chamber a piezoelectric active portion as a substantial drive portion of the piezoelectric element and a piezoelectric non-active portions having the piezoelectric layer continuous from the piezoelectric active portion but not being substantially driven, the piezoelectric non-active portions being provided on both end portions of the piezoelectric active portion in a longitudinal direction thereof,

electrode wiring drawn out of the upper electrode is provided on one end portion in the longitudinal direction of the pressure generating chamber, and

there is provided a protection layer on the other end portion in the longitudinal direction of the pressure generating chamber for protecting the vibration plate being provided in a region facing an end portion of the pressure generating chamber and in region facing an end portion of the piezoelectric layer within the region facing the pressure

generating chamber.

2. The ink-jet recording head according to claim 1, wherein said piezoelectric layer has crystals subjected to a priority orientation.

3. The ink-jet recording head according to claim 2, wherein said piezoelectric layer has crystals shaped in a columnar shape.

4. The ink-jet recording head according to claim 1, wherein a film thickness of said piezoelectric layer ranges from 0.5 to 3 μm.

5. The ink-jet recording head according to claim 1, wherein the protection layer is provided so as to cover a region facing a corner portion of the pressure generating chamber.

6. The ink-jet recording head according to claim 1, wherein the protection layer is composed of the same layer as the electrode wiring.

7. The ink-jet recording head according to claim 6, wherein the protection layer is provided so as to cover the end portion in the longitudinal direction of the piezoelectric non-active portion.

8. The ink-jet recording head according to claim 6, wherein the protection layer is provided as to extend beyond a boundary of the piezoelectric active portion and the piezoelectric non-active portion.

9. The ink-jet recording head according to claim 1, wherein the protection layer possesses higher rigidity than the lower electrode.

10. The ink-jet recording head according to claim 1, wherein the protection layer is also provided one end portion of the pressure generating chamber.

11. The ink-jet recording head according to claim 10, wherein the electrode wiring doubles as the protection layer.

12. The ink-jet recording head according to claim 1,

wherein the lower electrode is formed across a plurality of piezoelectric elements,

a lower-electrode-removal portion is formed at each of the pressure generating chambers by removing the lower electrode on at least the end portion of the lower electrode opposite to the electrode wiring of the pressure generating chamber, and

the protection layer is formed only within the lower-electrode-removal portion.

13. The ink-jet recording head according to claim 12, wherein the lower-electrode-removal portion has an approximately rectangular shape.

14. The ink-jet recording head according to claim 1, wherein the lower electrode is formed across a plurality of piezoelectric elements, and

a lower-electrode-removal portion is formed continuously over a region corresponding to the plurality of pressure generating chambers by removing the lower electrode on at least the end portion of the lower electrode opposite to the electrode wiring of the pressure generating chamber.

15. The ink-jet recording head according to claim 1, wherein at least the piezoelectric layer constituting the piezoelectric element is formed independently within the region facing the pressure generating chamber.

16. The ink-jet recording head according to claim 1, wherein the piezoelectric non-active portion on at least the other end portion in the longitudinal direction of the pressure generating chamber is provided in a manner extending to the outside of the region facing the pressure generating chamber to protect the vibration plate by eliminating the end portion of the piezoelectric layer within the region facing the pressure generating chamber, and

a region of the piezoelectric non-active portion provided

by extending to the outside of the region facing the pressure generating chamber constitutes a part of the protection layer.

17. The ink-jet recording head according to claim 16, wherein at least a width in the vicinity of a portion of the piezoelectric layer constituting the piezoelectric non-active portion, the portion which traverses a boundary of the end portion in the longitudinal direction of the pressure generating chamber and the peripheral wall, is wider than a width of the pressure generating chamber.

18. The ink-jet recording head according to claim 16, wherein at least the piezoelectric non-active portion on the side of the other end portion in the longitudinal direction of the pressure generating chamber is formed by removing the upper electrode.

19. The ink-jet recording head according to claim 15 or 16, wherein at least the piezoelectric non-active portion on the side of the other end portion in the longitudinal direction of the pressure generating chamber is formed by removing the lower electrode.

20. The ink-jet recording head according to claim 1, wherein said pressure generating chamber is formed by subjecting a single crystal silicon substrate to anisotropic etching, and

each layer of said piezoelectric element is formed of a thin film by a lithography method.

21. An ink-jet recording apparatus comprising:

the ink-jet recording head according to any one of claims 1 to 20.